



# Facing Stormwater Management Challenges at a Southeastern Army Installation

## *US Army Garrison Fort Gordon*

Presented By:

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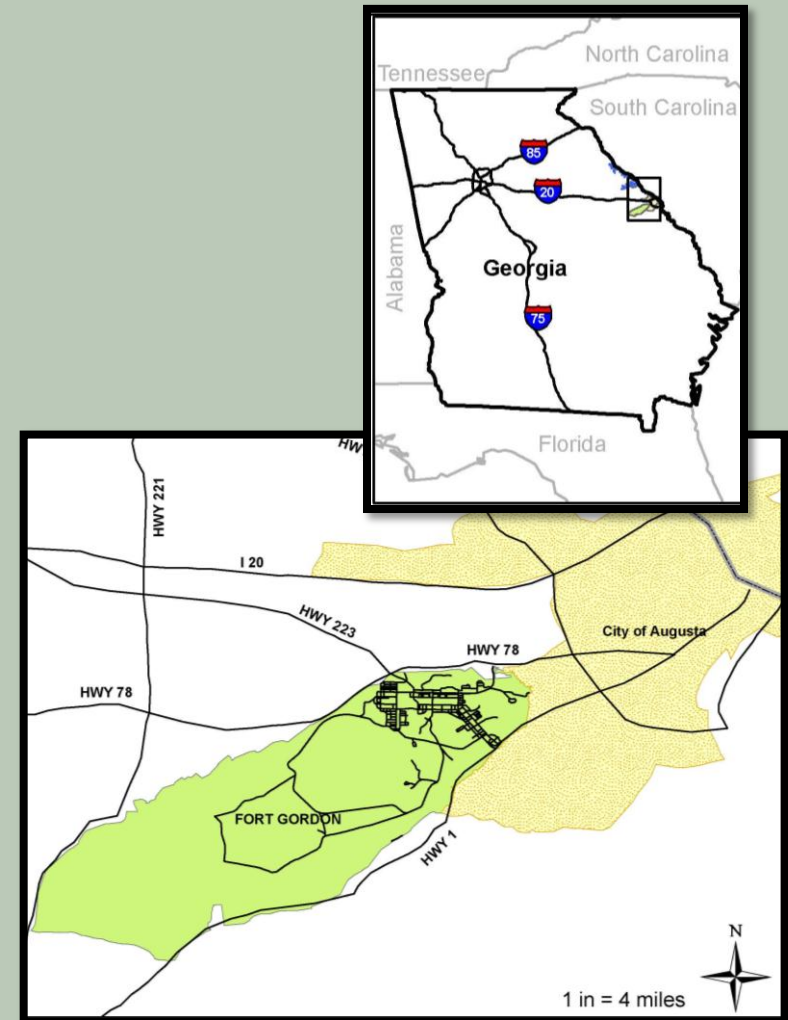
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# Overview

- Background on Fort Gordon
- Stormwater Permits
  - Municipal
  - Industrial
- Additional Miscellaneous Stormwater Challenges

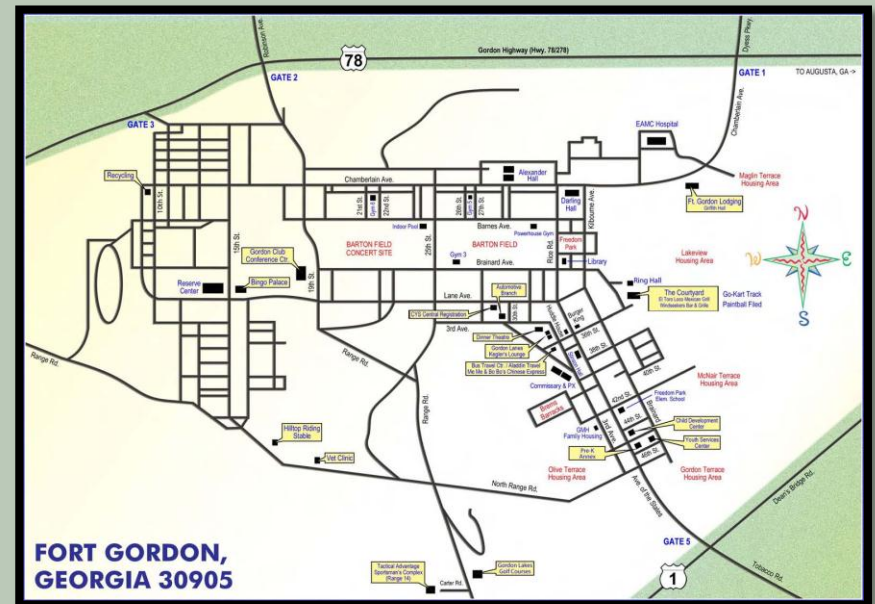
# Fort Gordon Background

- Located adjacent to the City of Augusta in Georgia
- Approximately 56,000 acres
- Richmond, Columbia, Jefferson, and McDuffie Counties
- Also includes Pointes West Recreational area located 30 miles NW



# Fort Gordon Background

- US Army Signal Center and School
- Dwight D. Eisenhower Army Medical Center
- Host to Army, Navy, Air Force, Marines and multi-national forces
- Supporting 17,950 military and 6,710 civilians



# Municipal Stormwater Permit

- Effective January 15, 2009 – January 14, 2012
- Follows guidance by GA Environmental Protection Division (GAEPD) for military facilities
- Addresses six minimum controls measures and any TMDL issues



# Municipal Stormwater Permit

## *Public Education*

- Poster and Tri-fold Brochure addressing:
  - Pet Waste
  - Household Chemicals
  - Fertilizers and Pesticides
  - Yard Waste
  - Automotive Products
  - Car Washing
- Distributed at Earth Day and other outreach events such as the Month of the Military Child



# ONLY RAIN DOWN THE DRAIN

## Be the Solution to Stormwater Pollution at Fort Gordon

### What are the Sources of Stormwater Pollution?

- Oil, grease, heavy metals and toxic chemicals from motor vehicles
- Pesticides and herbicides from lawns and gardens
- Yard waste from landscaping and lawn care
- Viruses, excessive nutrients and bacteria from pet waste

### Why Prevent Stormwater Pollution?

- To prevent contamination of drinking water sources
- To protect our precious water resources for recreational activities such as swimming, fishing and boating
- To protect plant and animal habitats from degradation
- To preserve the natural beauty of our landscape
- To help Fort Gordon comply with the NPDES (National Pollutant Discharge Elimination System) Phase II stormwater permit and *reduce pollutants found in stormwater runoff from urbanized areas to the "maximum extent practicable."*

### What is Stormwater Pollution?

Stormwater runoff results when rain cannot soak into the ground because of impervious surfaces, such as roads and rooftops. Stormwater pollution results when stormwater runoff picks up, carries and discharges various pollutants (i.e. pesticides, fertilizers, sediment, pet waste, litter, etc.) into the storm drains. Since stormwater drains are not connected to the wastewater treatment system, the polluted stormwater is then discharged directly to our nearby streams and ponds, degrading water quality.



### Illicit Discharges and Stormwater Pollution

An illicit discharge is an unlawful act of disposing any substance other than stormwater into the stormwater drainage system (storm drains, ditches). Common examples of illicit discharge materials include paint, oil, antifreeze, yard waste, etc. These pollutants degrade water quality and threaten aquatic life, wildlife and human health.



You can do your part by keeping all non-stormwater materials away from and out of all curb inlets, grates and water bodies at Fort Gordon. You can also participate in a Storm Drain Marking Event and spread awareness about stormwater pollution prevention by labeling the storm drains.

#### Pet Waste



Pick up dog poop and dispose in the garbage.

#### Household Chemicals



Dispose of unwanted chemicals at collection centers.

#### Fertilizers & Pesticides



Avoid the use of fertilizers and do not apply before heavy rain.

#### Yard Waste



Never throw leaves or clippings in streets or storm drains.

#### Automotive Products



Recycle waste oil by taking it to a recycle center.

#### Car Washing



Wash your car at a commercial car wash.



If you see someone dumping any solids or liquids into the stormwater drainage system, please contact: **John Wellborn** at (706)791-6237 or via email at [john.wellborn@us.army.mil](mailto:john.wellborn@us.army.mil) or leave a message on the **Stormwater Support Line** at (706)791-4286.

If you and/or your organization/volunteer group are interested in participating in the Storm Drain Marking Program or other activities, please contact: **Stephanie Hadley** at (706)791-6278 or via email at [Stephanie.m.hadley@us.army.mil](mailto:Stephanie.m.hadley@us.army.mil).



Fort Gordon appreciates your help in protecting our valuable water resources.



# Municipal Stormwater Permit

## *Public Involvement*

- Art contest in local school for Storm Drain Marking Program



### PARTICIPATE IN FORT GORDON'S

**EARTH  
WEEK**



**ART  
CONTEST**

Theme: Keep the storm drains clean  
for those downstream



Open to students in grades 4-8 attending Freedom Park Elementary School or Fort Gordon Youth Activities.

One entry per student.

Develop your poster based on the theme mentioned above.

No computer graphics.

Deadline is March 31, 2009.

Entry must include the student's name, grade, and the name of their teacher.

The school will select 10 finalists and submit the art work to the Environmental Division.

A panel of Environmental staff will select the final winner based on overall design and creativity.

**The winner will receive \$50 and have their artwork and name printed on the back of the Earth Week T-Shirts.**



Please direct any questions to Stephanie Hadley  
791-6278 hadleysm@gordon.army.mil



# Municipal Stormwater Permit

## *Illicit Discharge and Detection Program*

- Storm Drain Marking Events held during Earth Week
- Volunteer Kit provided with all supplies needed for storm drain marking







# Municipal Stormwater Permit

## *Illicit Discharge and Detection Program (continued)*

- Outfall Reconnaissance Inventory following CWP Guidance
- Food Services Education Material

### Fats, Oils and Grease (FOG) Management for Fort Gordon Food Service Facilities



It is important for military, civilian and contractors working in food service facilities at Fort Gordon to understand that food waste may be causing stormwater pollution and contributing to other environmental problems. Implementing certain Best Management Practices (BMPs) and practicing responsible pollution prevention can help in the following areas:

- preventing stormwater pollution and protecting nearby streams and lakes;
- preparing for inspections from Fort Gordon environmental staff, the State Department of Health or even the federal government; and
- increasing safety in your work environment.

#### Food Service Facilities and Fats, Oils and Grease (FOG)

Food service facilities refer to restaurants, grocery stores, and any facility requiring a health department permit for food preparation. The major pollutants from activities at such facilities are commonly referred to as Fats, Oils and Grease (FOG).

FOG refers to wastewater components that result from food preparation and animal/vegetable processing. Common sources of FOG are meats, nuts, vegetable oils, butter/margarine, dairy products, soups and gravies.



Activities at food service facilities that cause stormwater pollution include:

- FOG poured down kitchen sinks;
- Oils and grease resulting from outdoor washing of kitchen equipment and/or improperly maintained grease traps; and
- Food waste and chemicals that leak from faulty dumpsters or other outside containers.



#### Best Management Practices (BMPs) for Food Service Facilities to help prevent Stormwater Pollution:

##### Waste Disposal



- Cover dumpsters and other waste containers to keep rainfall out;
- Never put liquid wastes in garbage dumpsters; and
- Never pour oil or grease down a sink or floor drain.

##### Good Housekeeping

- Install and maintain proper grease control equipment;
- Keep dumpsters and loading dock areas clean;
- Recycle oil and grease wastes (call US Food Service at 706-854-7745 or 803-951-4200 for grease collection); and
- Inspect dumpsters regularly for leaks and replace if necessary.



##### Cleaning

- Clean for spills immediately with absorbent material like rags and dispose in garbage (do not hose down spill);
- Wash greasy equipment only in designated wash areas where pretreatment devices are connected to the sanitary sewer system; and
- Dry wipe pots, pans and dishes to remove food wastes prior to washing.

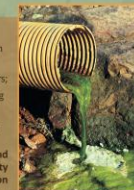


#### Why should Food Service Facilities care about Stormwater Pollution?

When food service providers improperly dispose of FOG/food wastes, they can cause stormwater pollution or problems at the wastewater treatment plant (WWTP) in several ways:

- FOG clogs drains, gutters, pipes and catch basins, which causes Sanitary Sewer Overflows (SSO) and rancid odors;
- FOG in wastewater can negatively impact the effectiveness of treatment at the WWTP, thereby causing harm to the natural environment;
- FOG can overflow or leak from grease containers stored outside and flow directly to natural water bodies, which could create a threat to human health and/or the environment.

Restaurants and other food service establishments can be closed down due to blockages and backups and can also be held financially responsible for such damages. Proper disposal of FOG is required by the City of Augusta FOG discharge requirements and the Fort Gordon National Pollutant Discharge Elimination System (NPDES) Phase II stormwater permit.



Fort Gordon appreciates your help in protecting our valuable water resources.

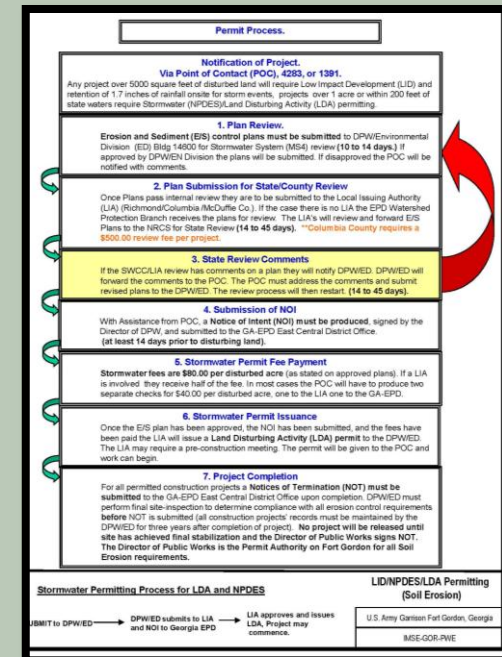




# Municipal Stormwater Permit

## *Construction Site Runoff Control*

- LID/NPDES/LDA Permitting Process
  1. Plan Review
  2. Plan Submission for State/County Review
  3. State Review Comments
  4. Submission of NOI
  5. Stormwater Permit Fee Payment
  6. Stormwater Permit Reissuance
  7. Project Completion



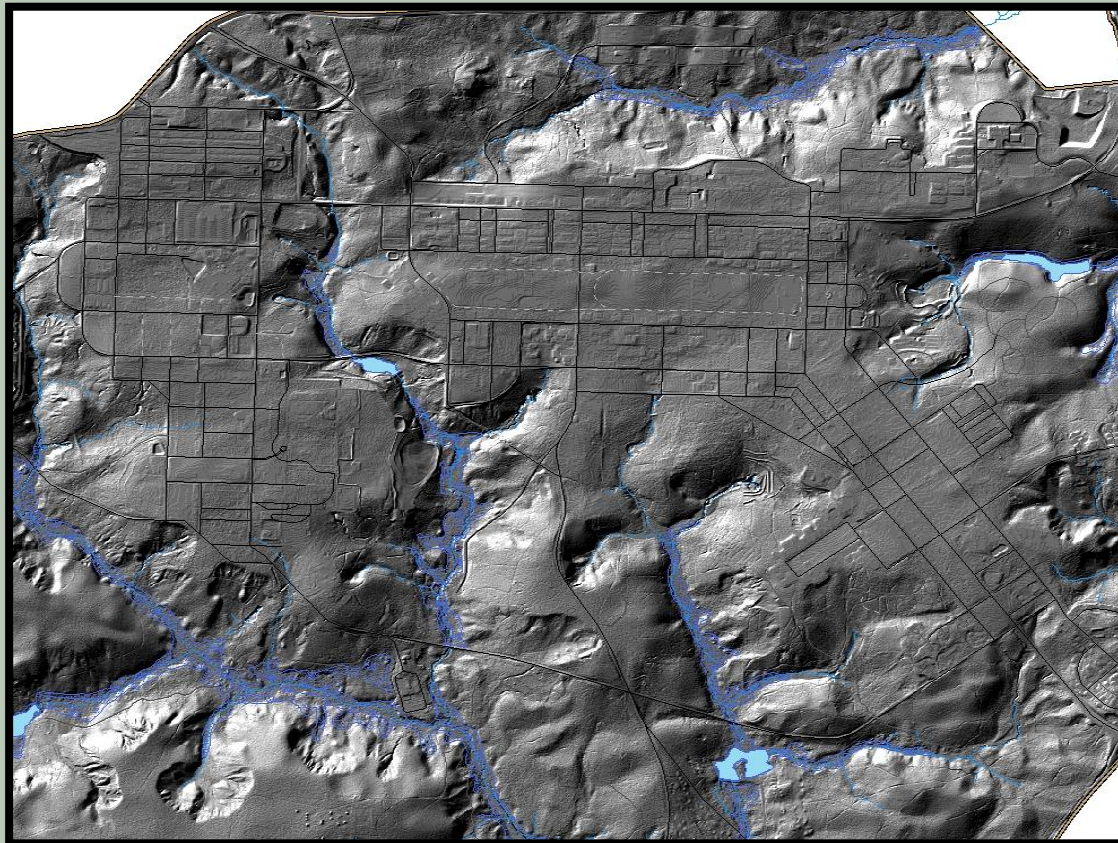




# Municipal Stormwater Permit

## *Post Construction Runoff Control*

- Existing Condition: Ft Gordon Built in WWI Era



# Municipal Stormwater Permit

## *Post Construction Runoff Control*

- MS4 Master Plan

1. Survey By Watershed
2. Modeling By Watershed
3. ID Capital Improvement Projects from Modeling
4. Implement Projects Per LID/ EISA Guidance

Flowchart for EISA §438 Implementation

1. Determine applicability

Requirement: apply to all Federal projects with a footprint greater than 5,000 square feet

2. Establish design objective

Requirement: maintain or restore predevelopment hydrology

OPTIONS

1

Total volume of rainfall from 95<sup>th</sup> percentile storm is to be managed on-site.

2

Determine predevelopment hydrology based on site-specific conditions and local meteorology by using continuous simulation modeling techniques, published data, studies, or other established tools. Determine water volume to be managed onsite.

Design water volume  
(to be retained)

3. Evaluate design options

Design water volume  
(to be retained)

Requirement: meet design objective to maximum extent technically feasible (METF)

TYPICAL ON-SITE DESIGN OPTIONS

Bio-retention areas  
Permeable pavements  
Cisterns / recycling  
Green roofs

Use any combination of on-site options to achieve the design objective to the METF. Document site-specific constraints.

Selected on-site design options

remaining water volume?

OFF-SITE OPTIONS  
(optional)

Selected off-site design options

4. Finalize design and estimate cost

TECHNICAL CONSTRAINT EXAMPLES

- Retaining storm water on site would adversely impact receiving water flows
- Site has shallow bedrock, contaminated soils, high groundwater, underground facilities or utilities
- Soil infiltration capacity is limited
- Site is too small to infiltrate significant volume
- Non-potable water demand (for irrigation, toilets, wash-water, etc.) is too small to warrant water harvesting and reuse systems
- Structural, plumbing, or other modifications to existing buildings to manage storm water are infeasible
- State or local requirements restrict water harvesting
- State or local requirements restrict the use of green infrastructure/LID





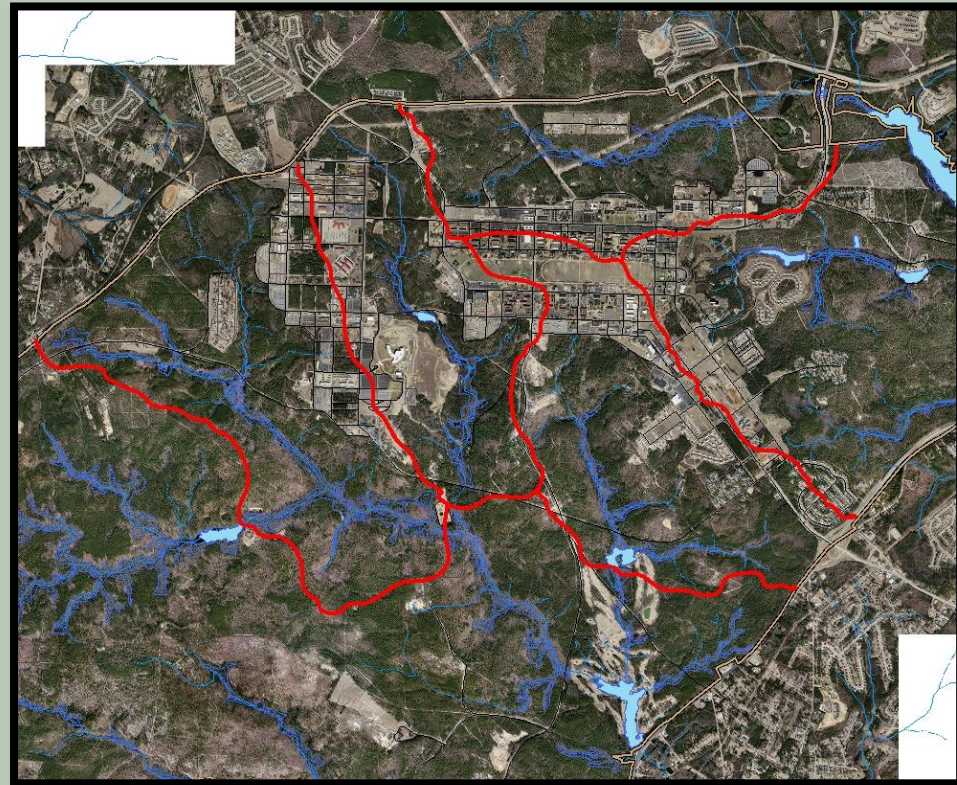
# Municipal Stormwater Permit

## *Post Construction Runoff Control*

- Survey MS4 by Watershed

EPA:

The goal of a watershed Approach is to maintain The quality and quantity Of aquatic resources Through strategic site mitigation

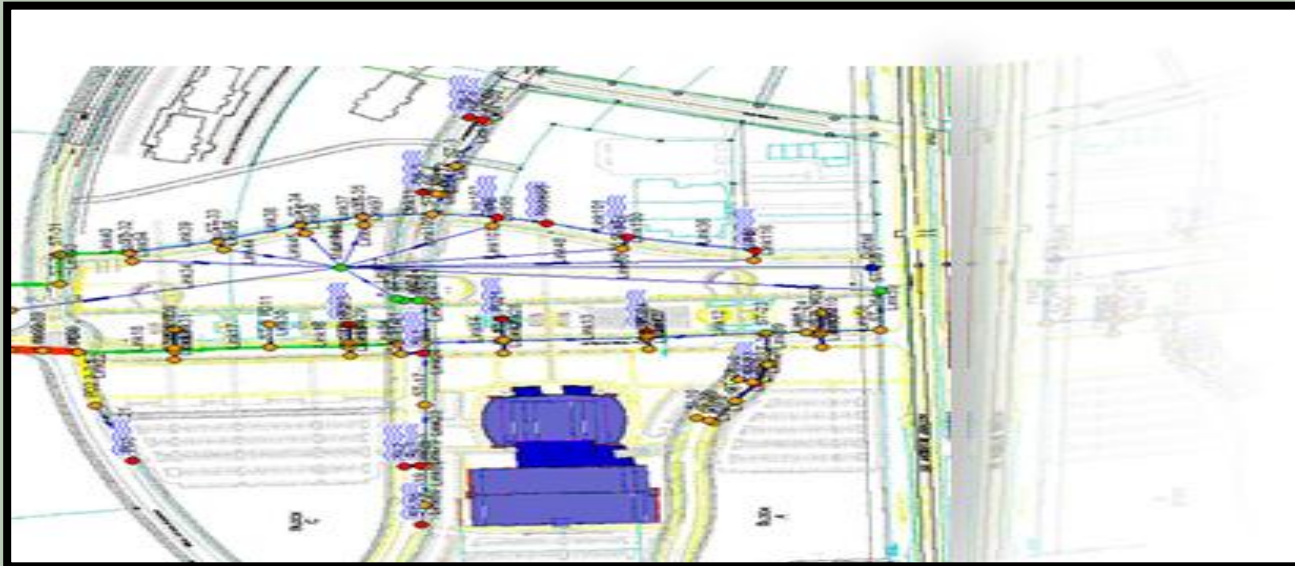


# Municipal Stormwater Permit



## *Post Construction Runoff Control*

- Use Stormwater Modeling Software to identify Deficiencies for the purpose of Remediation Projects and Post Project Validation.
- Information is included in MS4 Annual Report





# Municipal Stormwater Permit

## *Post Construction Runoff Control*

- Remediation Projects using LID/ESIA

Restore the  
Pre -Development  
Hydrology



# Outfalls with Critical Erosion

*Priority Area 1 – 9<sup>th</sup>*

*Street/Escarpment:*

- Approximately 30 ft drop
- Stormwater conveyance (flow diversion, pipe removal)
- Erosion control (live staking, planting, matting)





# Outfalls with Critical Erosion

United States Army

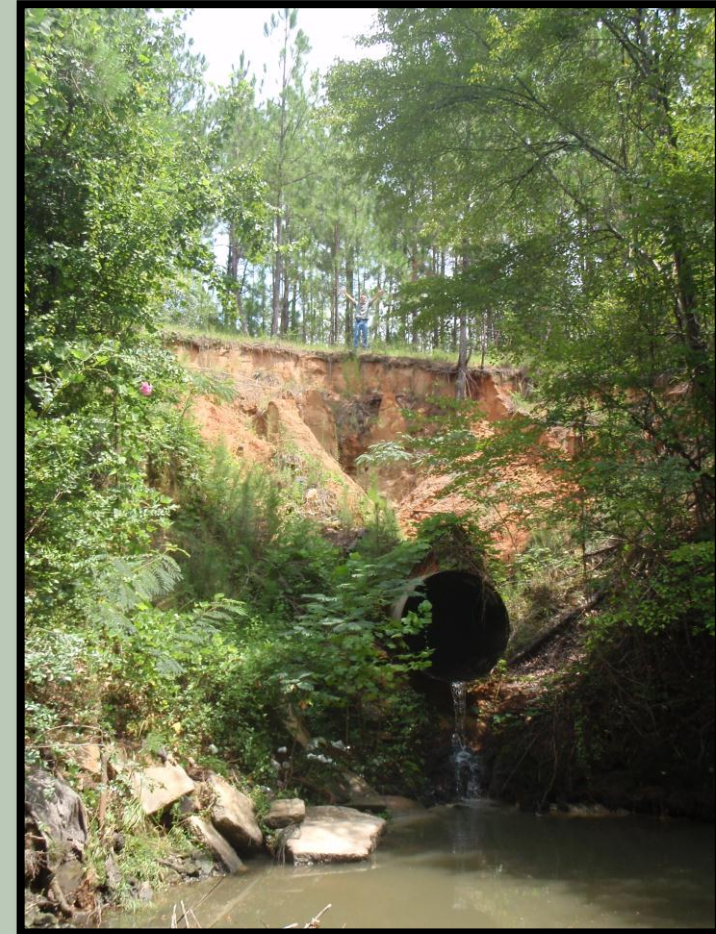
FORT GORDON

Main Gate



## *Priority Area 2 – Lane Avenue:*

- Approximately 50 ft drop
- Stormwater management (constructed riffle)
- Streambank stabilization (geolift, log vane)



# Outfalls with Critical Erosion

United States Army

FORT GORDON

Main Gate



## *Priority Area 3 – Chamberlain Avenue/Griffith Hall:*

- Approximately 20 ft drop
- Streambank stabilization (J-hook vane, geolift)
- Outfall protection (drop inlet, plunge pool)





# Municipal Stormwater Permit

## *Good Housekeeping/Pollution Prevention*

- Inspections
- Training






### Best Management Practices (BMPs) to Prevent Stormwater Pollution at Fort Gordon Motor Pools







Fort Gordon appreciates your help in protecting our valuable water resources.

Stormwater runoff results when rain water cannot immediately soak into the ground because of impervious surfaces, such as roads, rooftops and sidewalks. Stormwater pollution results when stormwater runoff picks up, carries and discharges debris and various pollutants (i.e. motor oil, solvents, antifreeze, cigarette butts, litter, etc.) into the storm drains. Since stormwater drains are not connected to the wastewater treatment system, the polluted stormwater that flows into these drains is discharged directly to our nearby streams and ponds. These untreated pollutants significantly degrade water quality and threaten aquatic life, wildlife, and human health.

As such, motor pool personnel are prohibited by state and federal laws from discharging pollutants, either directly or indirectly, into storm drains. In accordance with the Fort Gordon National Pollutant Discharge Elimination System (NPDES) Phase II stormwater permit, Best Management Practices (BMPs) must be implemented at all Fort Gordon motor pools. The following BMPs can help prevent stormwater pollution and help motor pool facilities be better prepared for environmental inspections.

**Storage:**

- Store wastes or bulk fluids within secondary containment to prevent leaks or spills.
- Store batteries, cans, parts and equipment indoors to avoid contact with rainwater.

**Changing Oil & Other Fluids:**

- Whenever possible, change vehicle fluids indoors on floors constructed of non-porous materials (avoid asphalt).
- Never pour vehicle fluids into storm drains or sewers.
- Never put any fluids into dumpsters because they can leak out.

**Parts Cleaning:**

- Never discharge cleaning solutions or wastewater to a street, gutter or storm drain.
- Remove heavy grease by wiping with rags before final cleaning in parts washer.
- Solvents are hazardous to employees and can ignite in sewers. Handle and dispose of them properly.

**Good Housekeeping Practices:**

- Apply absorbents onto spills and dry sweep the floor.
- Do not hose dirt, oil, grease and other pollutants into the storm drain.
- Keep fully stocked spill kits readily available.
- Conduct regular inspections so that leaks and spills are detected immediately.

**Recycling:**

- Crush or split used oil filters to drain oil and recycle as scrap metal.
- Recycle old and lead acid batteries, solvents, antifreeze, motor oil and lubricants per Fort Gordon's Hazardous Waste Management Plan at: [www.gordon.army.mil/dow/waste.html](http://www.gordon.army.mil/dow/waste.html)

**Vehicles:**

- Position drip pans (preferably with reusable absorbent pads) under active leaks of vehicles.
- Park fuel trucks within portable secondary containment and cover downstream inlets with flexible rubber mats. Inspect secondary containment regularly.







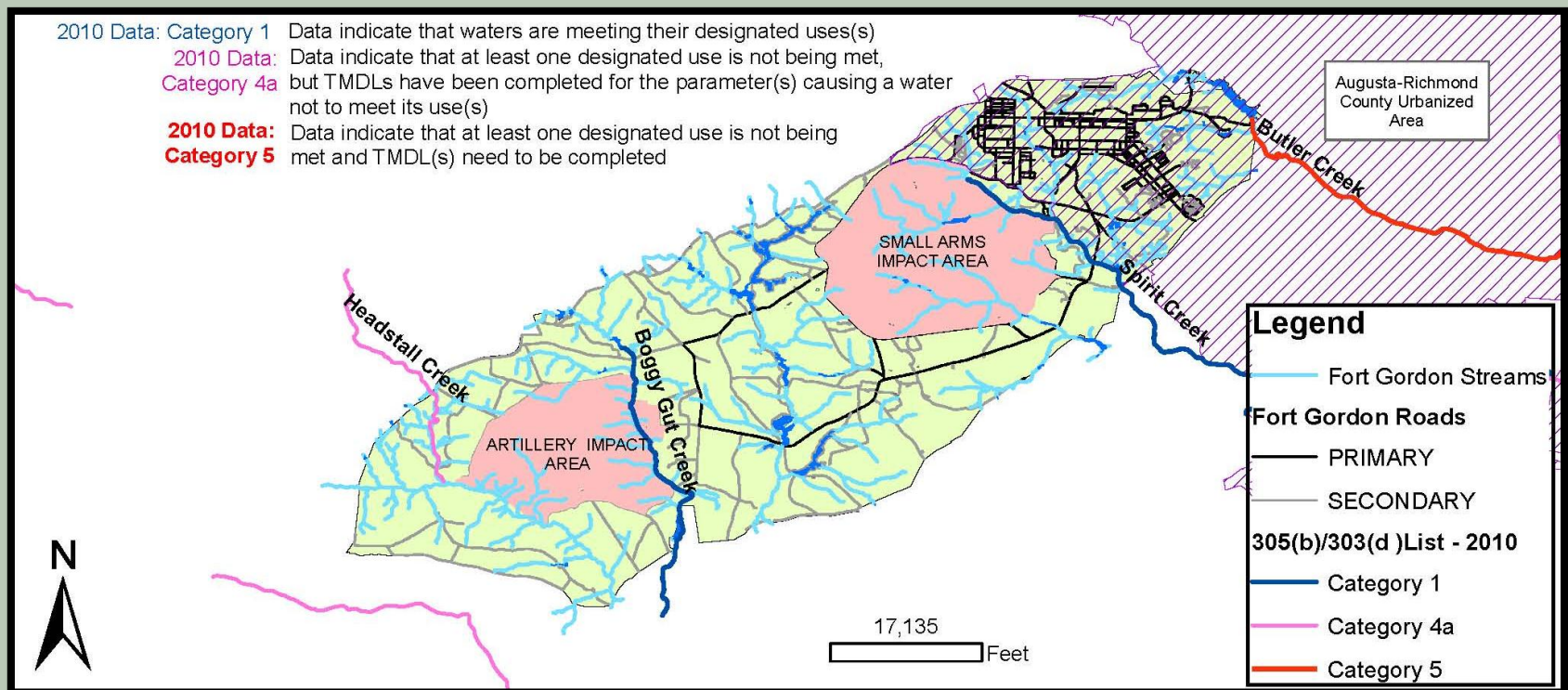





# Municipal Stormwater Permit

## *TMDL Issues*

- Headstall Creek not Fort Gordon related
- Butler Creek



# Industrial Stormwater Permit

- Effective August 1, 2006 through July 31, 2011
- Effective date extended until new permit effective June 1, 2012
- Stormwater Pollution Prevention Plan or SWPPP
- Annual comprehensive site evaluations and reporting
- Quarterly Outfall Visual Assessments



# Industrial Stormwater Permit



- SWPPP
  - Last complete update in June of 2011
  - 125 sites (*78 regulated and 47 non-regulated*)
    - borrow areas
    - landfills
    - motor pools
    - Remaining miscellaneous industrial activities





# Industrial Stormwater Permit



- Quarterly Outfall Visual Assessments
  - Within 30 minutes of actual discharge from storm event
  - Storm events: discharges that occur at least 72 hours from the previous discharge
  - Color, odor, turbidity, floating solids, settled solids, suspended solids, foam, oil sheen, other
  - Location, date, time, personnel (including signatures), observations, probable sources
  - Documentation of any necessary corrective action

# Industrial Stormwater Permit



## *Challenges with New Permit:*

- Outfall assessments (*over 104 outfalls!*)
- Dye/smoke tests to investigate illicit connections for sinks and floor drains
- Water hardness testing
- Establishing new concentration levels for 12 different pollutants in the effluent
- Daily/monthly discharge monitoring





# Sediment and Erosion Control

- Identify highly eroded soils outside cantonment
- Estimate soil loss
- Develop GIS database
- Prioritize erosion sites
- Recommend BMPs
- Conceptual designs for top two sites





# Sediment and Erosion Control



- Prioritization
  - Proximity to endangered species
  - Health and safety concerns
  - Sediment potential
  - Cost potential
  - Barren acreage
  - Proximity to streams/impaired streams
  - Severity of erosion
  - Expansion potential



# Additional Stormwater Challenges

- Budgetary, contract and manpower constraints
  - New industrial permit
  - Additional municipal permit requirements  
*(based on comments on annual reports)*
- Increased installation requirements associated with BRAC
  - Inheritance of Fort Gillem Enclave *(near Atlanta)*

# Questions?



United States Army

FORT GORDON

Main Gate



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